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Original Paper

The Gravity and Photons

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Abstract

One of the most important concept in geometry is, ***distance****, which is the Quanta in geometry, while in Material-Geometry the composition of opposites,* ***the Material-point*** *which is the Quanta in Chemistry and Physics.* ***As in Algebra*** *Zero, 0, is the* ***Master-key*** *number for all Positive and Negative numbers and this because their sum and multiplication becomes zero, and the same on any coordinate-system where ± axes pass from zero,* ***Exists also Apriori in Geometry the Material-Point*** *in where the Rolling of Positive ⊕, constituent on the Negative ⊖, constituent, creates the Neutral Material point which Equilibrium. Angular momentum is identical with* ***Spin*** *and consists the* ***First-Discrete-Energy-monad*** *which occupies,* ***Discrete Value and Direction****, in contradiction to the point which is nothing, Dimensionless and without any Direction.*

From the definition, Work = motion ***= Force*** *x* ***Displacement = Energy****, results the where this Energy as, Momentum Vector $\bar{B}$ ≡ Spin ≡ Energy is stored, and it is the,* ***r*** *cave.*

It was proved that, the ***r*** *cave ≡* ***The Particle****,* ***IS****, Outward a Stationary* ***Box,*** *Inward a Stationary* ***Wave*** *with infinite frequencies $f_1 ... f_n \rightarrow f_\infty$ and with Energy,* ***The Wave,*** *$E = h.f_n = (n\sigma/8r^2).\bar{\boldsymbol{B}}$. [70]. In all above issue the Kepler-laws, denoting that both Macrocosm and Microcosm Obey the Newton's Laws of motion in all Scales.*

Keywords

What is Gravity, Gravity and Planet-Orbits, Gravity and Black-Holes, Gravity and Atom-Rims

1. Introduction

A.. It was shown [33-36] that Un-clashed Fragments through the center, O, consist the Medium-Field Material-Fragment → [± s²] = [MFMF] ≡ ***The Chaos***, as base for all motions, and Gravity as force [∇i], while the clashed with the constant velocity, $\bar{c}$, consist the Dark matter [±$\bar{c}$.s] and the Dark energy [$\bar{c}$.∇i], ***declaring that*** → Antimatter-Galaxies and Antimatter-Asteroids can exist only as Dark-matter or/and Dark-Energy and **Not** as Antimatter light, **- c**, alone, or from → velocity - Breakages, [±s ²= ±(wr) ²] and

[$\nabla i = 2(wr)^2$], where then become Waves [*The distance* ds = $|AA_E|$ *is the Work embedded in monads and it is what is vibrated*] with the Vibrating equations of motion, to become,

A → Particles, with Inherent Vibration occupying distance r = ds = $|AA_E|$,

B → Gravity-Field-Energy without Vibration, the only Stationary-rotating material-points.

C → Dark-matter-Energy constituents as below,

A.. [$\pm\bar{v}.s^2$] → Fermions, *Quarks and Leptons*, and → [$\bar{v}.\nabla i$] → Bosons,

B.. [$\pm s^2$] → [MFMF] *Neutral* Field ≡ ***The Energy - Chaos***, and the *Negative-Energy* binder Field is [∇i] → Gravity force as dipole,

C.. [$\pm\bar{c}.s^2$] → Dark matter, and the binder Gravity force [∇i], [$\bar{c}.\nabla i$] → The Expanding Dark Energy, *Positive-Energy*, which both are moving with light velocity, c, causing the universe to grow.

From above in, **A**, *and* **C**, *case → Energy as velocity,*$\bar{v}$, *exists in the Discrete monads,* $\pm\bar{v}.s^2$ *and* $\pm\bar{c}.s^2$

B, ***case is the transportation of Energy, from Chaos to stationary Material points.***

Dark Energy DE ≡ **[$\bar{c}$.∇i] (©)** → Acting, *Positive-Energy*, on the Five Constituents → **{(∇i),(+s ^{2}),(-s ^{2}),(+cs ^{2}),(-cs ^{2})}** gives [$\pm s^2$] → MFMF Field [$\pm\bar{c}.s^2$] → DM-DE Field, of, Dark matter and Anti-matter [$\pm\bar{v}.s^2$] → Fermions [∇i] → G_f ≡ Gravity-Force in DM-DE Stationary Field. [$\bar{v}.\nabla i$] → Bosons, [$\bar{c}.\nabla i$] ≡ DE → Dark Energy **c x** (©) [∇i] → Gravity Force DE ≡ [$\bar{c}.\nabla i$] = $\bar{c}$ [∇i] = The Travelling-Energy with, **c**, velocity.

In all above issue Kepler-laws, denoting that ***Macrocosm and Microcosm***.

Obey Newton's Laws of motion in all Scales, as is proofed.

It is shown that Motion may be ***Linear or Rotational*** for any displacement, **r**, so exists a constant-work W = k and conserved in orbits, during these motions as,

$$\mathbf{k} = \bar{\mathbf{v}}\mathbf{x}\bar{\mathbf{v}}.\,\bar{\mathbf{r}} = \mathbf{v}^2\mathbf{r}.\ \bar{\mathbf{n}}. = v^2 r = (wr)^2 r = [\frac{2\pi}{T}r]^2 r = \frac{4\pi^2 r^2}{T^2}.\ r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2.\ \frac{r^3}{T^2} = 4\pi^2.r^3\mathbf{f}^2{}_{\mathbf{p}}$$

A Photon during Motion in [MFMF] Chaos, collides with other Photons by means of Cross-Product and produces a constant Work which is stored ***into the Only-Four*** Energy-Geometrical-Shapes, of the motion which shapes are the Conic-sections.

The Interior motion is kept in its Wavelength-Tank 2r = nλ while the Linear motion is continued by the Propagating Electromagnetic-Wave → it is the Energy-conveyer,

i.e.**,** The stored energy in the loop is → $\mathbf{W_1} = \mathbf{v}^2[\frac{\mathbf{h}}{\mathbf{2\pi}}] = \mathbf{4\pi^2.r^3.}f^2{}_p$, it is **The Particle** and dependent on velocity, **v,** and Planck's constant **h,** or ***on loop***, **r,** ***and frequency***, $\mathbf{f_p}$, which is **The Wave**. It is proved that this minimum Energy-constant → k = g.

B.. **Kinetic Energy**, *motion,* ***in Orbits*** becomes from the, ***Piezoelectric-effect***, where Orbit is subjected to a Mechanical-stress, $\boldsymbol{\sigma} = \pm\ \frac{\mathbf{4\pi r}}{(\mathbf{1}+\sqrt{\mathbf{5}})}.\,\mathbf{f_p}$, *becoming from the Centripetal-acceleration* $\bar{\mathbf{a}}_{\mathbf{P}}$ *of the* ***Planet***

and thus is appeared a Positive charge at the ***Nucleus*** and a Negative-charge at the ***Planet***, so is created an electric-signal with a given frequency $\mathbf{f_p}$**.** The two faces at **N** and **P** are connected by the in-between

Energy-Vectors $\overline{B} = \frac{\pi r^3 \sigma}{8} [1+\sqrt{5}]$ of Gravity-field-Pointy Material-Point [∇i] =[⊕↻↺⊖].

C.. **Orbit** or, ***Negative-Energy-Rim in monad, the-Atom,*** is the Stable and Stationary Granular-lattice-Energy-Disk, which is kept in the Plane-Orbit of motion, *Ellipse area*, πab, ***in Gravity-field,*** and in a way is ***Opposite*** to that which ***Follows the Central motion***, i.e., the Gravity-Force-Vectors $\overline{B}$, which is the Spin [⊕ ↻↺⊖] of the Material-points. *These are Spinning-Plane-packets into the Orbit-Rim as* ***the Energy-Granular-Conveyers*** for the interactions between, **Nucleus N** and the orbiting object, *the* **Planet P**, and consists the quanta, ***the minimum constant energy***, of rotational motion → [⊕↻↺⊖] ← and is equal to **g**.

D.. **Black Holes** Follow Kepler laws where, *On any moving Particle when is Tangentially-colliding* **or** *under any angle* **φ** *with a Material-Point executing Circular motion*, then the Total Energy is Negative, the Particle follows constant Elliptical-Energy-Orbits on the same semi major axis as, $\mathbf{1 = c.\ f_n^{\,2}\ a^3}$ and of the same constant Energy. Semi major axis, **a,** is related to energy as → a = GMm / 2E**,** i.e., for very large Energies, semi major axis a, tents to a **Negative-Energy-Point**, which is the beginning of the Black hole such as in microcosm and macrocosm. ***For axis*** a → 0, ***then*** $f_n \to \infty$, which is a Black-hole. From equation is seen the way that **Energy** as, *frequency or velocity or acceleration or any other mode of motion*, Response **on Space**, a axis.

E.. The {n} **Energy-Storages** of The Moving-Monads. Figure-1.

In Store, r, Wavelength $\lambda_n = \frac{2\,r}{n}$, Fundamental-frequency $f_1 = [\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Work = h.$f_1$

The Energy-Storage length E-P = λ/2, and is composed of 4 Lobes with wavelength

$\lambda_4 = \frac{2\,r}{4}$, $f_4 = \frac{4\,v}{2r} = 4f_o$, $W_4 = \frac{h}{2r}\, v_4$ *and for* → Total-Work

$W = [\frac{4\pi r^2 f1}{3}].n.(n+1)$ or $W = \frac{80.\pi r^2 f1}{3}$, $v_4 = \lambda_4.f_4 = 4.\lambda_4.f_o$

n = 1→ $f_1 = 1.[\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Wavelength $\lambda_1 = \frac{2\,r}{1}$, Energy $W_1 = [\frac{4\pi r^2}{3}].f_1 = 1.\frac{(1+\sqrt{5})\sigma\, r}{3}$

n = 2→ $f_2 = 2.[\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Wavelength $\lambda_2 = \frac{2\,r}{2}$, Energy $W_2 = [\frac{4\pi r^2}{3}].f_2 = 2.\frac{(1+\sqrt{5})\sigma\, r}{3}$

n = 3→ $f_3 = 3.[\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Wavelength $\lambda_3 = \frac{2\,r}{3}$, Energy $W_3 = [\frac{4\pi r^2}{3}].f_3 = 3.\frac{(1+\sqrt{5})\sigma\, r}{3}$

n = 4→ $f_4 = 4.[\frac{\sigma(1+\sqrt{5})}{4\pi r}]$, Wavelength $\lambda_4 = \frac{2\,r}{4}$, Energy $W_4 = [\frac{4\pi r^2}{3}].f_4 = 4.\frac{(1+\sqrt{5})\sigma\, r}{3}$

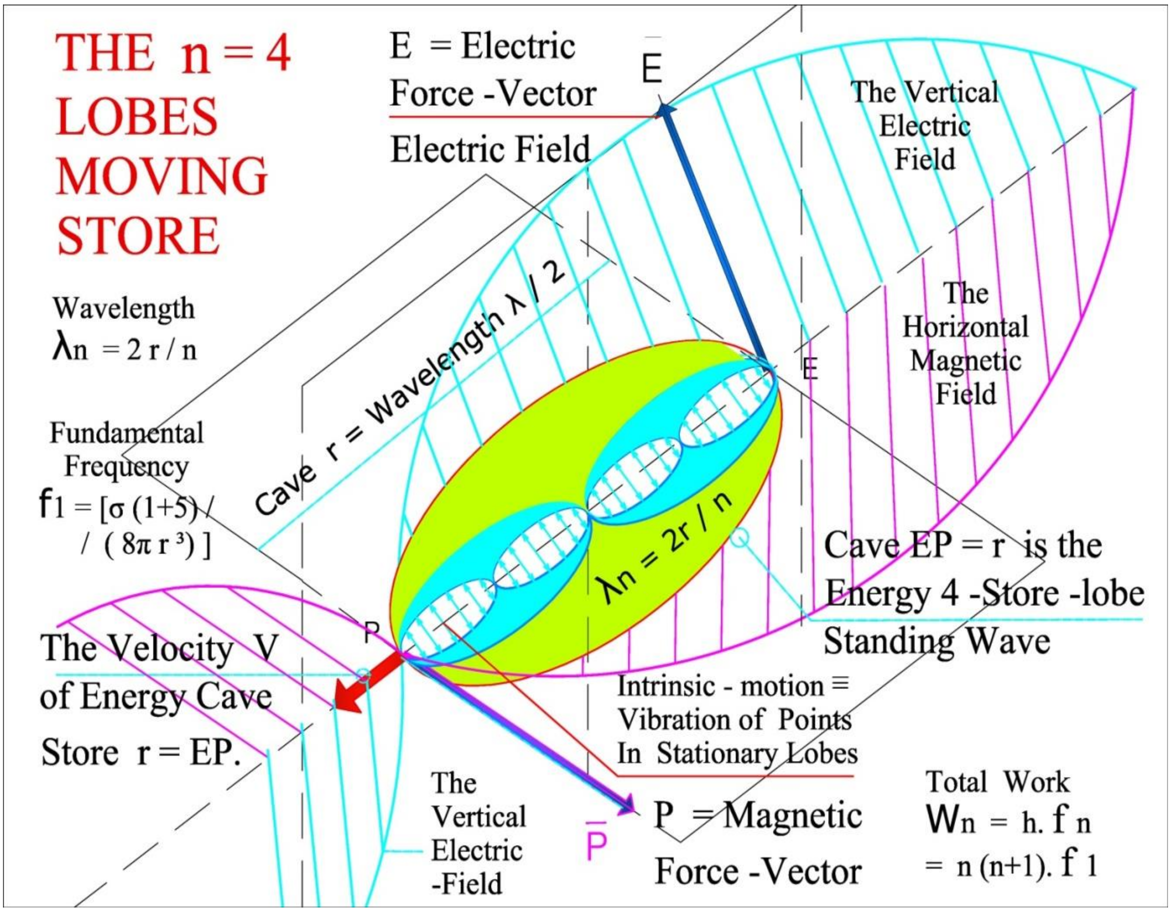

Figure 1. The Photon as n-Lobes Energy-Store≡Particle ≡ [nλ=2r] and E-M Wave ≡[λ = cf]

In Figure 1, r =λ/2 = EP is the ***Energy-Storage-monad*** [S≡EM-R ≡ $f_{1=N}$, $f_2, f_3, f_D,, f_n$] with wavelength $\lambda_N = \frac{\sigma.(1+\sqrt{5})}{4\pi r} = \frac{n.\bar{B}}{4\pi r^2}$ ≡ **Particle**, where velocity $\bar{v}$ = w.r, follows the ***Breakage-Principle*** which is Quaternion $\bar{z}$ = [s +$\bar{v}$ ∇i] or → s ²- |$\bar{s}$| ²+ 2|s| ²∇i ← ≡ [εE² + μB²] ≡ ***The Energy-monad*** **EP, The Wave,** as,

Matter (+) ≡ Magnetic-field → [μB²]

Antimatter (-) ≡ Electric-field → [εE²]

Energy (+↔ -) ≡ Motion in **n** lobes → [$\partial E/\partial t$, $\partial H/\partial t$], i.e.,

The stationary-cave-lobes, consist the ***Particle-Photon*** with the Inside motion, in the **r** = **n** [λ/2] Energy-Storage, and [E ²+ H ²] = 2.(2r).c.**sin 2φ**, the ***Wave Photon*** as the Outward motion.

Energy-Storage-monads are consisted of the above ***three-constituents*** all-together, or each-one of them

Work ratio is → $W_n / W_1 = f_n / f_1$ = n (n+1).[v_n / v_1] = n (n+1) $\frac{\lambda_n f_n}{\lambda_1 f_1}$ = n (n+1) $\frac{n.\lambda_n f_n}{2r.f_1}$ = n^2(n+1) $\frac{\lambda_n}{2r}$ = n (n+1) and for λ_n=2r, $v_n = v_1$ then, **n.** $\boldsymbol{\lambda_n}$ **= 2.r, or**

The Work, W, Produced ***from the Wave-Energy-Pattern with wavelengths*** $\boldsymbol{\lambda_n}$***, and*** Created ***from all Points of the Periodic Oscillation in the Cave,*** **r*****, is Stored into the,*** **n*****, Integer and Energy-Lobes of cave*** **r.**

From Mechanics, the ***Only-Possible motions*** are, ***the Periodic excitation***, and ***the Revolving motion*** therefore all ***Moving-Energy-Stores travel*** as ***a Wave and Not*** as a ***Particle***. The **n**, Energy-tanks, the N Antinodes in its Store 2λ = r = h/p ≡ [f_1 ,f_2, f_n ≡ n lobes] follows the *Stationary-Wave-Nodes-Principle*, i.e.,

The Glue-Bond-Stress Rotation of opposites on Small-circles creates **Integer number of lobes**, ***which is the Wave-Nodes-Principle of the moving-energy-stores***, one of which is the Photon.

F.. **The Photon:** Electromagnetic waves are created by the vibration of an electric charge. In Material-point, the eternal rotation of the ⊕ constituent around the ⊖ constituent creates the, n, Energy-lobes in a tank r = n $\frac{\boldsymbol{\lambda}}{\mathbf{2}}$ or λ = $\frac{\mathbf{2r}}{\mathbf{n}}$ since the velocity of the wave is $\bar{\mathbf{v}}$ = f x λ. The frequency is f = $\frac{\mathbf{n}.\bar{\mathbf{v}}}{\mathbf{2.r}}$ where **n** is a positive integer number.

Because in lobes the inner particles are the [+], [-] constituents of Space and of Anti-space, the maximum amplitude of each constituent is related with its position and each amplitude oscillates periodically as the **wave equation**,

$$\mathbf{x} = \mathbf{v_o}.\,\mathbf{sin\,wt} = \text{A.sin}\ [\sqrt{(\mathbf{a/Am}).\mathbf{t}} + \pi/2\ ], \qquad (1)$$

where

a.. Velocity → $|\bar{v}|$ = w.r/2 = $\frac{2\pi}{2T}$.r = 4πr., and $f_n = \frac{n.v}{4r} = \frac{n\sigma}{8r}[1+\sqrt{5}\,]$,

b.. Angular velocity → $|\bar{w}| = \frac{\sigma}{2r}[1+\sqrt{5}\,]$ and *Fundamental frequency* f = $\frac{(1+\sqrt{5}\,]).\sigma}{4\pi r}$

in cave, r. and then, Wave propagate, as in a magnetic-device the arced pattern, by travelling from North to the South Pole and thus creating the Inner-Electromagnetic-Displacement-current → ∂E/ ∂t, ∂H/ ∂t ← *and when reduced to one line is as*, E → **∂E/∂t** → H → **/∂t** → **H**.

This vibration of opposites creates a wave which has both an Electric, **E**, and an Magnetic component, **H**, perpendicular each other and is as equation,

$$[E^2 + H^2] = 2.(2r).c.\mathbf{sin\,2\varphi} \qquad (2)$$

in where exists the **Skin-effect.**

This happens because of the difference in density ***on Stress-common-curve*** ρ = σ instead – of ρ = 0 at the center.

This Property in Material-point Launches ***The Inner-Electromagnetic-Wave***, **The-Particle** ≡ [E ²+ H ²] = 2(2r).c.**sin 2φ**, of wavelength, λ, ***Outward λ***, as ***The Outer Propagating - Electromagnetic-Wave*** → {**The-Wave** ≡ [εE² + μB²] = 2.λc.sin.2φ} ← *which is the conveyer of* The-Particle,

and allows all the ***Energy-Wave-Storages*** to Propagate any Distance in Vacuum without dissipation. This Inner-motion ≡ Work W, from the Wave-Energy-Pattern with Wavelengths $\boldsymbol{\lambda_n}$, is created from all ± Points of the Periodic Oscillation in any cave **r**, and is stored in the **n** lobes as motion. This motion is conserved and is transported through vacuum at the speed of light **c.** Since the

Medium-Field-Material-Fragment → [± s²] = [MFMF] ≡ *The Chaos*, is the base for all motions, ***then it is***, ***the Motion of Photons***: All motions create Work which is conservated. Motion presupposes velocity vector $\bar{\mathbf{v}}$ which, *when it is in motion collides with other velocity vectors*, creating a Constant Work **k**. Motion may be ***Linear or Rotational*** for any displacement, **r**, so exists in vectors the constant-work → $\mathbf{k} = \bar{\mathbf{v}} \mathbf{x} \bar{\mathbf{v}} . \bar{\mathbf{r}} = \mathbf{v}^2 \mathbf{r}$, and is as follows,

From relation $n\lambda = 2r$ and $2r = nv/f$, issues $v = \lambda f \rightarrow \bar{\mathbf{v}} = \bar{\mathbf{c}} = \lambda f$.

Constant-Work $k = v^2 r = (wr)^2 r = [\frac{\mathbf{2\pi}}{\mathbf{T}} r]^2 r = \frac{\mathbf{4\pi^2 r^2}}{\mathbf{T^2}} . r = \frac{\mathbf{4\pi^2 r^3}}{\mathbf{T^2}} = 4\pi^2 . \frac{\mathbf{r^3}}{\mathbf{T^2}} = 4\pi^2 . r^3 . \mathbf{f^2}_{\mathbf{p}}$ → which are the universal ***Kepler Laws for macrocosm***. i.e., ***Photon during Motion in* [**MFMF**] *Chaos collides with other* Photons,** *by means of Cross-Product* ***produces a constant Work which is stored into the* Only-Four *Energy -Geometrical - Shapes, of the motion which are the Conic-Sections.***

The Interior motion is kept in its Wavelength-Storage* 2r = n λ*, and the Linear Outward motion is continued by the Propagating Electromagnetic-Wave, the conveyer.

The mechanism of ***Energy-transport through a Medium*** involves the ***Absorption and the Reemission*** of the wave-energy by the atoms of the material. Since Quanta of Energy occupy a finite space $\lambda = 2r$, as motion, then an electromagnetic wave impinging upon the atoms of a material, its energy is absorbed by the atoms of the material, and since Energy ≡ motion then occurs ***Resonance***, and electrons within the atoms undergo vibrations. After a short period of vibrational-motion, the vibrating electrons create a ***New Electromagnetic wave*** with the same frequency as the first one and thus delay motion through the medium.

Because energy is related to wavelength λ, then once the energy of EM-wave is reemitted then it travels through a small region of space between atoms and once it reaches the next atom the EM-wave is absorbed and transformed into electron vibrations and then reemitted as an Electromagnetic-wave.

The actual ***speed of an Electromagnetic-wave through a material-medium***, due to the Absorption and Reemission-process, is dependent upon the ***optical-density*** of the medium, or when their atoms are closely packed upon their, ***material-density***. i.e.,

Photon is an Energy-store, **r**, in a Stationary-wave of wavelength **n λ = 2r,** consisted of **n** stationary lobes filled in **λ** with inner motion the Electromagnetic-Displacement-current, while is Outward Propagating with light speed as Energy-store **λ = 2r / n**, [+] Electric-field as Space, [-] Magnetic-field as Anti-space.

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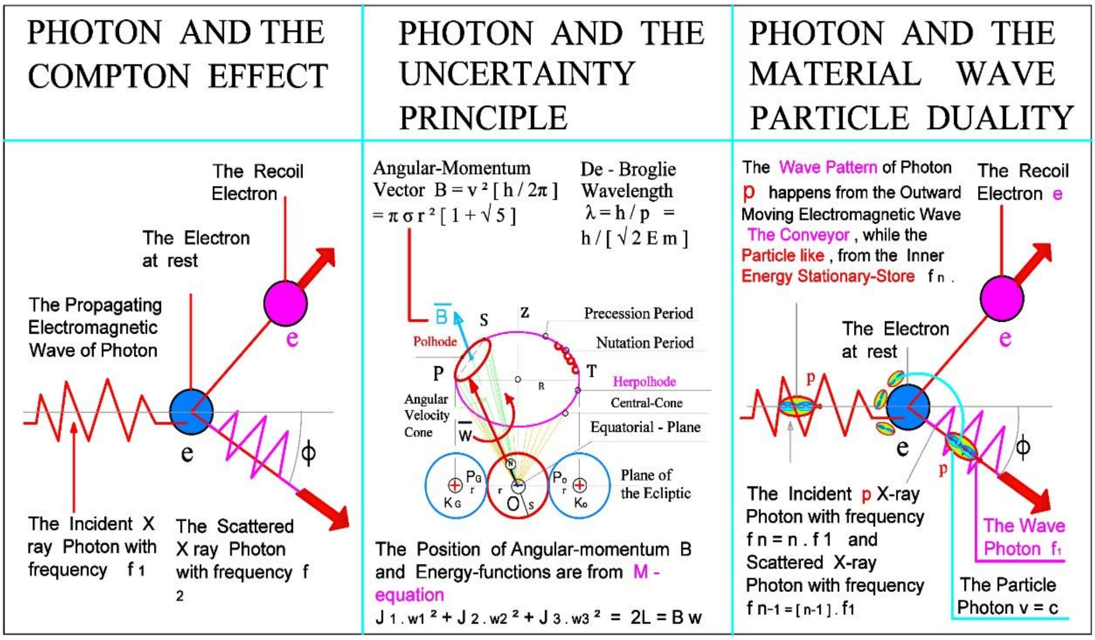

Figure 2. The Wave [$\mathbf{f_1}$= (E ²+ H ʒ)] - Particle [$\bar{\mathbf{v}}$ = $\bar{\mathbf{c}}$ = λf] → Duality

The Outward Propagating Electromagnetic-Wave → [$\mathbf{f_1}$ = (E ² + H ʒ)] is the Conveyer, of the Stationary-Wave Particle → [$\bar{\mathbf{v}}$ = $\bar{\mathbf{c}}$ = λf = 2r.f] ≡ [f_1 ,f_2, f_n ≡ n lobes]

1.. The experiment of A-Compton, *light behaves as a wave*, is consisted on an X-ray Photon of frequency f_1 which collides with a stationary electron and Scattered with frequency $f_2 < f_1$ which is energy loss.

2.. The Uncertainty Principle for the Wave-Particle accepts each particle with a definite momentum can be described by a Wave-function, which created the suspicious of finding a Particle in the biggest envelope of the wave. ***Instead of it momentum* B*, rotates into the, Angular-Velocity-cone.***

3.. The Material Wave-Particle Duality. All moving Energy-Storages are ***Standing-Waves***-Particles as ***all Quantum-Particles,*** and the ***Propagating-Energy as Electromagnetic-Wave*** is the Wave and is their Conveyer.

In Energy-Storages issues the ***Stability of Equilibrium*** as this in Energy-Rims = Orbitals, also.

a.. *Compton Effect*: The moving stores which are the EM-Waves are consisted of three parts,

1.. The Energy-store r = n.$\frac{\boldsymbol{\lambda}}{\mathbf{2}}$, is consisted of, n, energy lobes in the Stationary-Wave of cave, r, as the frequency $\mathbf{f_n} = \frac{\mathbf{n\sigma}}{\mathbf{8r}}$ [1+ $\sqrt{\mathbf{5}}$], and consists the Massive-Particle-Energy-part of Photon, **p.**

2.. The Vertical Electric-field **E** is perpendicular to **r,** axis and consists the Space-Wave-Energy-part of Photon.

3.. The Horizontal Magnetic-field **P** perpendicular to **r** axis and field **E**, both being always in Phase and consists the Anti-space-Wave-Energy-part of Photon.

b.. *Wave-Particle duality and Uncertainty Principles*: All quantum objects and Photon, exhibit Wave-like and Particle-like properties such as diffraction and interference on the length scale of their wavelength. Experiments confirm that the Photon is not a short pulse of Electromagnetic radiation because it does not spread-out as it propagates, nor does it divide when it encounters a beam splitter. Because Photon is a ***Material-point*** is absorbed or emitted as a whole by arbitrary smaller than its wavelength or even point-like electrons or small-systems.

It was shown [66] that Photon which is an *Energy-Storage-monad* is consisted of *two-real-constituents,* ***and one Energy. That imaginary-constituent*** *which creates the Electromagnetic field**, is resulting from the local and Energy-cave,*** by launching The Inner-Electromagnetic-Wave of monad **λ = 2r /n** outward the λ.

c.. *Material Wave-Particle Duality*: The Recoiled-electron position can be resolved to the New position as well as the Scattered Photon of the Energy-storage by its new frequency. Momentum equal to Spin is not changed because issues the law of energy-conservation. Electromagnetic energy is supplemented by the incoming wavelength λ = 2r/n, or by angle φ. The Storage r, *which is the Particle Photon*, modifies the Intrinsic-radiation and avoids spontaneous emission.

A photon with E ⊥ B wave when entering a transparent material, Photon is absorbed by an atom and the reemitted, because wave vector would not be preserved, by the material and there would be scattering.

Light Storage, r ≡ E⊥H, using electromagnetically-induced transparency, interaction between photon and an Ensemble of atoms ***is tuned***, *to the group velocity of the photon and E-M wave is reduced to zero* and to the remaining EB-Storage-field-Particle within the interaction zone.

The excitation is not purely photonic, but instead has been mapped smoothly from a single photon to an ensemble of EB-Storage atoms.

Photon is regenerated by its Intrinsic Electromagnetic wave E ⊥ B and is indistinguishable from the input one, exactly the same.

The interpretation that the Photon has been stored within the material is false, on the contrary Storage is the E, H, Energy-tank with the **n**, frequencies, $\mathbf{f_n}$ in Photon, and the Electromagnetic Radiation E, B, which is the conveyer → *the carrier*.

G.. **The Total-Energy in loops:** It was shown [58] that the maximum velocity in a closed system occurs in Common circle, when the two velocities, $\bar{c}$, $\bar{v}$ are perpendicular between them, and are not producing Work, from where then dispersion follows Pythagoras theorem and the resultant Quantized linear Space length, **r**, becomes, as the Resultant of Energy Vectors, r = |($\bar{c}$.T)| = $\sqrt{v^2 + c^2}$ and by using Space Vector $\bar{r}$ = |($\bar{c}$.T)| = $\sqrt{v^2 + c^2}$ then, The total Rotating energy is → ± $\bar{\Lambda}$ = $\bar{p}$.r = (M.c).r = (M.c). $\sqrt{v^2 + c^2}$ and squaring both sites $[\pm \bar{\Lambda}]^2 = p^2 r^2 = M^2 c^2 (v^2 + c^2) = (M^2 v^2).c^2 + M^2 c^4 = (p^2 c^2) + M^2 c^4 = [p.c]^2 + [m_o.c^2]^2$ or is $E_T = E_R + E_K$ → Total-Energy of Elementary-particle = Intrinsic Rotational + Kinetic Energy, The velocity of Elementary particles is the light velocity c = v = 2πr. f_e and frequency → $f_e = \frac{c}{2\pi.r}$ ……..(a)

Rotational Energy $E_R = \bar{B}.\bar{w} = 2L = J.w^2$ and → $E_R = [\frac{\pi r^4}{8}].[\frac{c^2}{r}] = \frac{\pi c^2}{8} r^2 = 3{,}535.10^{16}.\ r^2$……(b)

Energy and frequency of Elementary particles can be found from cave **r,** only since, **c**, constant,

Total-Energy → $\mathbf{E_T} = E_R + E_K = \frac{\pi c^2}{8} r^2 + \frac{1}{2} m.v^2 = \mathbf{3{,}535.10^{16}.\ r^2 + \frac{1}{2} m.v^2}$………(c)

Mass of elementary particles is $m = \frac{E}{2r^2.w^2} = \frac{J.w^2}{2} . \frac{1}{2r^2.w^2} = \frac{J}{4.r^2} = \frac{\boldsymbol{\pi.r^2}}{\mathbf{16}}$, i.e., dependent on radius of cave.

Dot product *and* Cross product:

The **Dot-product** happens for interactions between Similar dimensions, while the **Cross-product** between Different-dimensions. Cross-product of two vectors $\bar{a}$, $\bar{b}$ is $\bar{a} \times \bar{b} = |\bar{a}|.|\bar{b}| \sin\theta.\bar{n}$ and for $\bar{a} = \bar{b}$ and $\theta=90^o$ then $\bar{a} \times \bar{a} = \bar{a}^2$ and for Quaternion, **s**, which performs the Work of rotating the one vector around the other →Work = $\bar{a} \times \bar{a} = \bar{a}^2 \bar{r}$, and for $\bar{a} = \bar{v}$ then, Work = $\bar{v}^2 \bar{r} = |\bar{v}|.|\bar{v}|.\bar{r} = v^2 r.\ \bar{n} = (wr)^2 r.\ \bar{n} = (2\pi r/T)^2\, \bar{n} = (4\pi^2 r^2/T^2).\ r.\ \bar{n} = \frac{4\pi^2 r^3}{T^2}.\ \bar{n} = \mathbf{W = 4\pi^2.\ \frac{r^3}{T^2}.\ \bar{n}}$, which is

the Kepler celestial law for ***microcosm***.

Since in Mechanics issues $z^2 = \mathbf{s^2 - s^2 + 2.s.s} = 1$, and from Unit-quaternion $s^2 + [iv]^2 = 1$ then is → $\mathbf{s^2 - v^2} = 1$ …….(d)

Equation (d) is a Cone relation on where Total-energy, Kinetic and Potential is conserved and for Photon, Electromagnetic radiation is the Kinetic-energy and the Velocity-vector-Energy-tank is the Potential**.** Photon is an Energy-store, **r**, in a Stationary-wave of wavelength n λ= 2r consisted of **n** stationary lobes filled in **λ** with inner motion the Electromagnetic-Displacement-current and Outward the Propagating, Energy-store λ = 2r / n, with the light speed, c, the two transverse fields, [the + Electric-field and the - Magnetic-field].

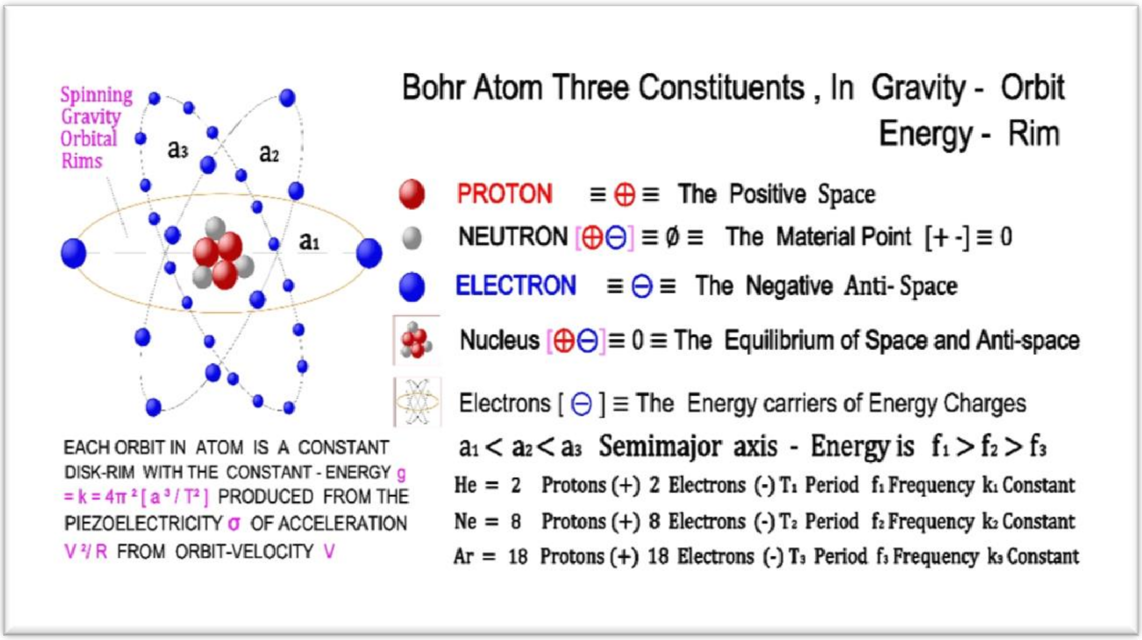

Figure 3. The Three Constituents in Bohr-Atom and the Spinning-Gravity in-Orbit Energy-Rim

Proton, in Bohr-model, consists the → Positive Breakage (+) of the three constituents, Electron consists the → Negative Breakage (-) of the three constituents, Neutron consists the → Equilibrium Material Point (+ -) of the Spaces and Anti-spaces.

Nucleus consists the → Equilibrium ***Positive*** Breakage Store, in Atom-Model.

Electron Orbits are the → Equilibrium ***Negative*** Breakage Store-Rims in Atom.

Orbital Electron is the → Moving-Charge-carrier of Energy in Atom –Model.

It was prior referred that, when Matter and Antimatter annihilate at rest or when Anti-space comes in contact with its regular Space counterpart, they mutually destroy each other and all of their Energy is converted to the ***Three Breakages*** → s^2, -$|\bar{v}|$? [2$\bar{w}$].|s| |r|.∇i ← where for, $\bar{v}$ = s ≡ the cave,

[s^2] → is the Real part, ***Matter***, of the new monad, and is ***a Positive Scalar magnitude***

-[**s** ^{2}**]**→ is the always Negative part, ***Anti-matter***, which is always ***a Negative Scalar-magnitude***.

2 **s** ?∇i → is the double Angular-Velocity Term, ***The Energy Term,*** and which is ***a Vector magnitude.***

Photon is a Material-point in cave **r**, where its **Inner** is ***the Stationary-Standing-wave*** Electromagnetic-Wave [E ^{2}+H ^{2}] =2(2r).c.sin 2φ with **n** Lobes representing the ***Normal mode vibration*** with frequencies f_n = n. f_1 = $\frac{E}{h}$ = $\frac{n.v}{4r} = \frac{n\sigma}{8r}$ [1+ $\sqrt{5}$], its **Outward** *as the Propagating Electromagnetic-Wave* →{[εE² + μB²] =2.λc.sin.2φ} ← *where* Particle 2r = n λ, **Cave** r**,** is the *Electromagnetic-Energy-Storage***,** and Electromagnetic-Radiation E, B **is** *the* **Wave** *conveyer*. Following above constituents of Photon then, Since ***Energy is motion*** and the, ***Total-Energy of Elementary-Particle*** is equal to the → ***Intrinsic Rotational*** + ***Kinetic Energy from velocity,*** *then* according to the conservation law of Energy, ***This Energy is stored into Neutral caves as Stationary Loops consisting the Lobes***, and thus producing the ***Space and the Anti - Space Particles with velocity vector the remaining of the Energy Term***.

The Breakage-Principle, is the way of Energy conservation, *where Energy never annihilates* ***and which is always reverted into*** → the *two Opposites* [(±**w**) or the Conveyers ≡ *Carriers*] *and an Neutral Part* 2. ∇i which is the Energy-store ≡ Tank Energy ≡ or as ***Matter*** (**+ w**), as ***Antimatter*** (**- w**) ***and as Energy part***, 2L = $\bar{B}.\bar{w}$

i.e., ***Energy ≡ Motion ≡ Space + Anti space + Kinetic Energy***, Vibrations of Systems issues for Orbits as → $\mathbf{W = 4\pi^2. \frac{r^3}{T^2}.\bar{n} = 4\pi^2.r^3. f^2_p.\bar{n}}$ ← and agree, to Kepler celestial law such as for ***macrocosm and microcosm***.

H.. **The Permeable Resonance-Path:**

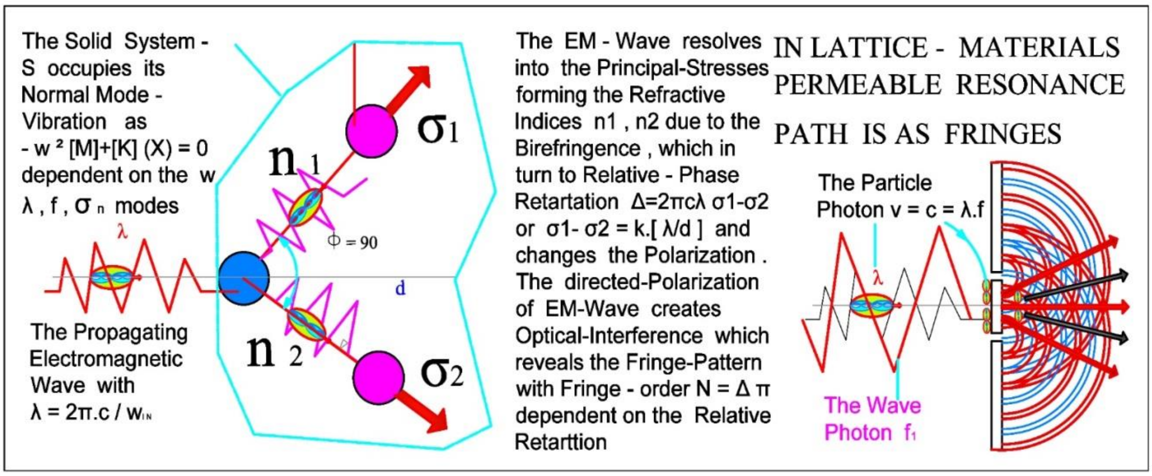

Figure 4. The Permeable Resonanace Path of Photon in Material - Systems

a) The Transmitted Electromagnetic Wave of wavelength λ =2πc/w ≡ c / f follows the Hook's Elastic deformation and resolves into the Principal Stresses-Pattern σ_1, σ_2.

b) The Permeable – Resonance - Path is for,

1) Solids → The Normal-mode-Vibration System { - w ²[M] + [K] (X) } = 0

2) Liquids →The Cauchy Stress-Tensor as Momentum equation $\nabla.\sigma = -\nabla p + \nabla.\tau$

3) Gases → The combined Avogadro's Pressure-law PV = n RT = **n**.mv ?3

4) Crystals → The Cauchy Ellipsoid-Stress-tensor where E⊥B⊥r ≡ $\sigma_1 \perp \sigma_2 \perp \sigma_3$

5) Molecules → The Lattice - Crystal -Arrangement

6) Atoms → The Chemical Bonds relation

7) Particles → The Resultance One-Dimensional-Collision $\bar{v}_{ij} = \bar{v}_j - \bar{v}_i = \bar{w}_{ij}.\bar{r}_{ij}$

8) M-Points → The Resonance-frequencies $\mathbf{f_R}$ [S≡ $f_{1=n}$, f_2, f_3, $f_{R=}w^2$] = $\mathbf{f_n}$= n $\frac{(1+\sqrt{5})\sigma}{4\pi r}$ = $\frac{n\sigma.\bar{B}}{8\,r^2}$

9) Cave-Orbit→ The Relation c.L_s = L_v , Light-velocity 3.10^{8} m/s*1.10^{-42}m

cave =3.10^{-34} m ?s are the Cave-Energy-Plane-Rims in Atom's, Planet orbits

***Remarks*:**

The Path Permeable to a common motion is following one of, **w, f, $\boldsymbol{\sigma_n}$** ,quantities as below procedure,

1.. A transmitted Electromagnetic wave with angular velocity vector w = 2πf = 2πc/λ strikes on a Body.

2.. The Electromagnetic wave entering into the Body follows Hook's Elastic deformation, and resolves into the Principal Net-Stresses-Pattern.

3.. Because of Principal-Stresses resolving, different Refractive-Indices are experienced on their perpendicular components due to the Birefringence.

4.. The difference in the Refractive-Indices leads to a Relative-Phase-Retardation between the components given as Δ = (2πc/λ).k.(σ_1-σ_2) or as $\sigma_1 - \sigma_2 = [\frac{\lambda}{d}].\frac{\Delta}{2\pi c} = k.\,[\frac{\lambda}{d}]$ ……….(a)

where

Δ = The Controlled Phase-Retardation from the transmitted Electromagnetic wave

$\lambda = \frac{2\pi c}{w}$, is the vacuum wavelength

d = The thickness of the Body or of Specimen

5.. The Relative Phase Retardation changes the Polarization of the transmitted EM Wave, which changes also the Polarization of the Principal stresses, and thus many different waves are so produced. The Optical interference of the Waves Fringe-Pattern are revealed with Fringe-order N =$\Delta/2\pi$ dependent on Relative-Retardation.

6.. By Studying the Fringe-Pattern one can determine the State of stress at various points of the material and the General Permeable Paths of the Electromagnetic-State of the body.

In Figure 4 is seen the Energy-Storage p, which is transported by the Electromagnetic conveyer f_n.

The Energy-Storages r = n.[$\frac{\lambda}{2}$] $\equiv W_{n(n+1)}$= [$\frac{4\pi r^2 f1}{3}$].n.(n+1), ***are travelling through Bodies and follow***,

Lame Stress Ellipsoid $n_1{}^2 + n_2{}^2 + n_3{}^2 = \frac{T_1{}^2}{\sigma_1{}^2} + \frac{T_2{}^2}{\sigma_2{}^2} + \frac{T_3{}^2}{\sigma_3{}^2} = 1$ on principal stresses $\pm\sigma_1$, $\pm\sigma_2$, $\pm\sigma_3$,

which ***is the Passage*** through which Forces (*The EM-Radiation*) travel in any Solid either in Motion or at Rest.

Laplace's Orbital Angular-momentum $e^{i.2\pi n} = 1$ and for n = 0,±1,±2,±3,.± n, consist the eigenvalues operator L_z ***which agree with prior*** Resonance-frequencies

$\mathbf{f_R}$ [S≡ $f_{1=N}$, f_2, f_3,$f_R = w^2$] *as wavelengths* $\lambda \equiv [f_1,\ f_2 \ldots f_n = w]$ ≡ *the* **n** *lobes*, or → $f_N = n\frac{(1+\sqrt{5})\sigma}{4\pi r}$ =

$\frac{n\sigma.\bar{B}}{8\,r^2}$, a Principal-Stresses σ, and a Resonance-frequencies $\mathbf{f_R}$ relation, which is the Energy stored in the Material-Points-lobes. [70]

Physical Properties and Crystal-types :

The ***Physical properties*** of Crystals, depend on the ***Kinds and Strengths*** *of the Attractive forces* that hold the particles together in the Bodies [Solids, Liquids, Gases, Crystals etc.] while the ***Types*** depend upon the Kinds of Particles located at sites in the lattice-Material-geometry-formation.

An Ion is an Atom or Molecule in which the number of Electrons differs the number of Protons, or $E_n \neq P_n$, and if $E_n > P_n$ or $E_n < P_n$ then is ***Negative or Positive Ion***. ***Lattice-crystal*** is a Regular 3D geometrical arrangement of Atoms, Molecules or Ions in a crystal, which follows the Material-Geometry rules. [70]

Lattice-energy is the Energy required to separate the Ions of an Ionic, with Atoms or Molecules Solid. The mapping of Crystal-types is as below,

Type-Particles at sites-Type of Bounding-Force-Properties-EM-Radiation

Ionic: ⊕, ⊖ Ions - Electrostatic ⊕ ↔⊖ - non-conductors - Infrared

Molecular: Atoms or Molecules-Dipole Attraction-Repulsion-non-conductors-Chemical-Bonds.

Covalent: Atoms-Network-Bonds between Atoms-non-conductors-EM-Spectrum

Metallic: Atoms-Ions and Electrons Attraction Conductors - E-conduction.

The ***Kinetic-Energy*** E_K of a moving Material-point, *as this is the Photon*, is stored as motion in its Storage, **r** = [n.λ/2] with the, **n** frequencies $f_n = n.f_1$, with **n** lobes and fundamental frequency f_1. From above is seen the ***Passage*** *and The-How EM-Radiation* ***can travel in Crystals*** and which are the Cauchy-stress-tensor where $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$, in-where Energy Propagates along Directions *without Birefringence*, and carries the Energy-Storage **r**, which radiation **is *The conveyer.***

Above procedure can be used in Cells, where cells are cases of a Birefringence material and the Resonance-Passage happens as the Force, *EM-Radiation in* ***Two*** *directions*, ***can travel in Cell*** through Cauchy-stress-tensor where the two Conveyers $E \perp B \perp r \equiv \sigma_1 \perp \sigma_2 \perp \sigma_3$, can carry the Energy-Storage, **r**, in Cell, and change the Inner-Structure of Cell to another desirable Property.

From Inner-velocity equation v = wr = (2π/T).r = 2π.f_1 r, wavelength λ = cT=c /f_1, cave r = n.[λ/2], then r = n.(c/2f_1) and **v** =2π.f_1[n.c/2f_1] = **n.π.c** or **v = n.π.c** (4) showing that velocities in lobes are, **n.π**, times that of light and for n = 1 then **v = π.c** more than three times faster of light velocity.

Because of the above velocity **v,** an **E** field is produced, which produces the $\partial D/\partial t$ field, which in turn produces the **H** field which produces the $\partial B/\partial t$ field and which again produces the **E** field, i.e., the total **EM**-field regenerates itself as it rotates, and *is a Phenomenon happening in a Propagating Plane-wave*.

Permeable-Resonance-Path is impossible in a three-times stronger EM-field.

I.. **The Conic Sections and Planar-curves**:

Menaechmus came to think of producing curves by cutting a cone from the circle definition which is → Since the center O of a circle is of equal distance to all points in Plane of the circumference the same also to all Centers $\mathbf{O_n}$ from center O which are on line $\mathbf{OO_n}$ and Perpendicular to this Plane ←

In Figure -5, Line $OO_n$is the generator axis of a right-angled cone and all the shapes of the curve produced by cutting a right-cone by a plane obliquely inclined to its axis is a conic section. In circle [O,OP] with only one center issues for point P, OP + PO = 2R is constant, while in ellipse [O_1P,PO_2] of two centersO_1,O_2 issues for point P, PO_1+ PO_2= major-axis, is constant. This property allows Central-motion to be seen as a Geometrical problem of Proportionals on Points and lines [44].

In [70] is $\overline{M} = [\overline{r}x\overline{p}] = \frac{d\overline{\mathbf{B}}}{dt}$ → the Theorem of Equal-Areas and Kepler's 1st Law, i.e., Momentum $\overline{p}$, of a force $\overline{P}$, to a constant center O, of radius $\overline{r}$, is equal to the change of the angular -momentum $\overline{B}$ at time t, related to the same center O, and its trajectory lies on the same Plane.

a.. The Geometrical Central motion :

Huygens and Johannes Bernoulli came to think of producing the Shortest-Time curve between Two points on a vertical Plane by a point acted only by gravity and which is, → To find the Path-curve or surface for which a given variation has a Stationary value, Stationary or Extrema is the maximum or minimum between two points (1), (2) ← It was proved the Cycloid.

From Geometry Figure 5, Equality A_1O = p/e = AP + OP.cos φ = r/e + r.cos φ and is → p = r + r e.cos φ = r (1+ e.**cos φ**) …..(1) where, p = a constant parameter, r = the orbit radius from O. Inversing (1) then → $\frac{1}{r} = \frac{1+e.\cos\varphi}{p}$ and Derivative → $\frac{d^2 1/r}{d\varphi^2} = -\frac{e.\cos\varphi}{p}$, → $\frac{d^2 1/r}{d\varphi^2} + \frac{1}{r} = \frac{1}{p}$ ……(2)

Integrating (2) is the acceleration at point P and equal to → $a = -\frac{4A^2}{r^2}\frac{1}{p}$ ………(3)

where the constant area O,P,P_1= A = $\frac{1}{2}. r^2\frac{d\varphi}{dt}$, and for ellipse the Area = ($\pi\ a_e b_e$).

For ellipse $a^2{}_P = p.b_P$, or $\frac{1}{p} = \frac{a_P}{b^2{}_P}$ and period of rotation T, then the Constant area for a period, T, is

A = ($\pi\ a_P b_P$) / T and (3) becomes $a = -\frac{4\pi^2.}{T^2 r^2} a^2{}_P b^2{}_P \frac{a_P}{b^2{}_P} = -[\frac{4\pi^2}{T^2} a^3{}_P]\frac{1}{r^2} = -[\frac{4\pi^2}{T^2}]\frac{a^3{}_P}{r^2} = -k\frac{1}{r^2}$ ….(4)

or acceleration $a = -[\frac{4\pi^2}{T^2}]\frac{a^3{}_P}{r^2} = -k\frac{1}{r^2}$, where $k = [\frac{4\pi^2 a^3{}_P}{T^2}] = 4\pi^2.a^3{}_P.f^2$ → a constant …….. (4a)

Equation (4a) is Kepler second Planetary law, Spotting constant k, to be a function of the Orbit ≡ $a^3{}_P$≡ the Semi-major axis ≡ Space and as a function of Time, T, or the frequency f_P of orbiting. This significant property is used also in atom's structure.

For circular motion $a^3{}_e$= r, then (4a) becomes $a = -[\frac{4\pi^2}{T^2}]\frac{r^3}{r^2} = -[\frac{4\pi^2 r}{T^2}] = 4\pi^2.r.f^2$ and $k = [\frac{4\pi^2 r^3}{T^2}] = 4\pi^2.r^3 f_e{}^2$ i.e.,

1.. Kepler's First law of Orbits: All Planets move in Elliptical orbits, with the sun at one focus.

2.. Kepler's Second law of Areas:

A line that connects a Planet to the sun sweeps out equal areas in equal times.

3.. Kepler's Third law of Periods:

The square of the period of any Planet is proportional to the cube of the semimajor axis of its orbit.

4.. Kepler's constant $k= 4\pi^2 r^3 (1/T)^2$: The constant k, is Not-Only constant during the motion of a Planet, because being also $k \cong r^3 (1/T)^2$= constant for all Planets.

5.. Spotting on Kepler's constant k: During the Central-Plane-motion of a Planet ≡ Momentum $\overline{B}$ and a Sun ≡ focus O, the coefficient $r^3.(1/T)^2 = r^3.f_P{}^2$is Constant.

Applying above property to Caves ≡ Energy-Storages ≡ Orbits, then since $r^3 f_P{}^2$= C = Constant, then change of, r, follows change of f_P, *or in cave*, Electromagnetic-wave $\mathbf{E_1} = [\frac{4\pi r^2}{3}].\mathbf{f_1}$= C, *constant*, is absorbed or emitted.

Remark:

1.. Since, Caves ≡ Energy-Storages ≡ Orbits ≡ Stationary-lobes ≡ Energy-Rims ≡ $r^3.f_P{}^2$ and Energy $E_n = n.[\frac{4\pi r^2}{3}].f_1$= C, therefore, Atoms are Wheel-Rim, the Protons-Neutrons in Nucleus and Electrons in Orbits is an Energy-Rim also, for each Electron-Energy-Orbit.

2.. It was shown that all particles have the same acceleration, g, in our gravitational field with frequency unchanged, and → velocity, d$\bar{v}$, with wavelength, λ, to be changed ← so light being a particle also is deviated in gravity field and, Inertial mass is equal to the Gravitational mass which is the Necessary and Sufficient Condition only in Mass of Material-point where c T = λ = c / f, of this Isochronous motion.

3.. The Spotting on Kepler's constant k :

Question : Since the Central-Plane-motion of point P=Planet ≡ Momentum $\overline{B}$, and a Sun ≡ Focus O is a Conic-section, to find of producing the Shortest-closed-Surface on any Plane, such that Energy ≡ motion, to be constant ≡ The closed-Surface of the two points, and which is,

→ To find the Energy-Path-closed-Curve of the two Points which Surface is of Constant-Energy. Constant is not a maximum or minimum magnitude between the two points P and O, instead it is a Fixed sum from rotation ≡ [⊕ ℧↺⊖] ≡ motion, trapped in a closed-curve ←

The Energy-quantity k is constant in Planck's scale cave 10^{-34} m and exist, in Plane Rims, becoming from the continuous Central-Rotation of masses in scales. It is shown in, Kepler's third law, that this constant is k = $[\frac{4\pi^2 r^3}{T^2}]$ = $4\pi^2.r^3\ f_P^2$; where for the Sun-Earth-Rim Semi-major-axis, r = 15.10^{10} m, and the period T = 1 year the Energy in this Plane-Sun-Earth Rim is k = 3.10^{-34} = $[3.10^{8}].10^{-42}$ $y^{-2} m^3$

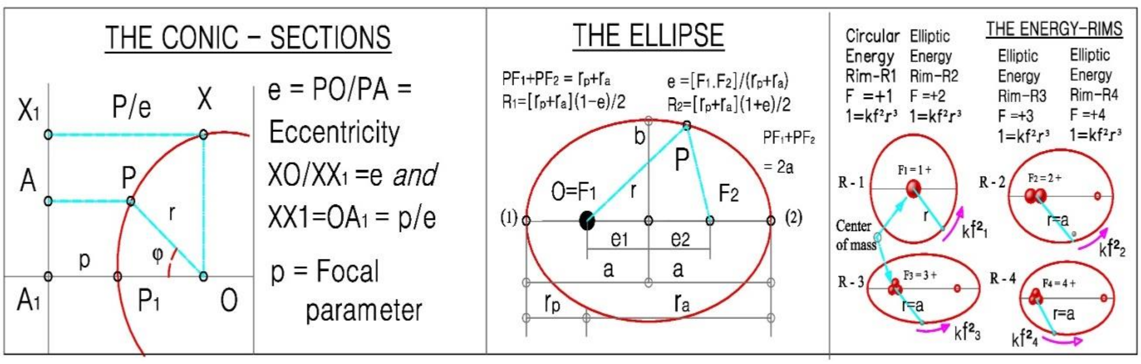

Figure 5. The Conic-Sections as Planar and Atoms-Curves under Equilibrium of Forces

1.. The generation of the Conic-sections : O = The constant center of rotation, P = The movable Point on Orbit, p = The parameter of the conic, e = the eccentricity of the conic $0 \leq e \leq 1$

2.. The Central Ellipse and Gravity relation for mass m_P→ Planet, On - m_S→ Sun.

3.. The Energy-Rim R_1 is circle because focus F_1 is consisted of one center, while the others for Focus F_n is of 2,3,4,n. centers due to ⊕ elements are Ellipse for every one ⊖ mass m_P. Kepler's constant Planets relation is $\frac{T^2}{a^3}$ = k = [$\frac{4\pi^2}{G.m}$] = $2,97.10^{-19}$ ($s^2 m^{-3}$), where G = $6,67.10^{-11}$ ($Nm^2 Kg^{-2}$) becomes from the Light-velocity-Storage, $\bar{v}$, when, $\bar{v}$, is entering the cave r =1.10^{-42} m, where is produced the Energy Plane-Cave-Rim equal to R_n = 3.10^{-34} $m^2 s$.

Since also exists the relation → $k.f_n^2 r^3 = 1$ ← where r = semi major axis a, then, An Energy-Rim is a Plane-Surface representing a Constant-Energy becoming from the squared frequency $\mathbf{f_n}^2$ representing the Imaginary - Energy - Part of monad, and $\mathbf{r_n}^3$ representing the Real-Space-Part of monad $1 = k.f_n{}^2 r^3$. All these Energy-Rims consist the Quantized-Plane-curves

4.. Central motion and Gravity :

Kepler's third law of harmonics suggested that, the ratio of the period of orbit squared (T^2) to the mean radius of orbit cubed (R^3) is the same value, $k = 2{,}97.10^{-19}\ s^2/m^3 = T^2/R^3$, for all the Planets that orbit the sun.

Centripetal force $C_F = m_P v^2 / R$ is the result of the Gravitational force that attracts the Planet towards the Sun and can be represented as Gravity-force →

$G_F = [G.m_P m_S] / R^2$ and is $\mathbf{C_F} = \mathbf{G_F}$.

Since the mean-velocity of a Planet is $v_P = (2\pi R) / T$ then $v^2 = (4\pi^2 R^2) / T^2$ and substituting to prior, Centripetal force $m_P\ [4\pi^2 R^2] / RT^2 = [G.m_P m_S] / R^2$ and by cross-multiplication is transformed to $T^2 / R^3 = [m_P 4\pi^2] / [G.\ m_P m_S]$ and canceling the same from numerator and the denominator then

$T^2/R^3 = [4\pi^2] / [G.m_S]$ or $Gm_S = [4\pi^2.f_P{}^2] R^3 = w^2 R^3$ where $E_1 = [\frac{4\pi r^2}{3}].f_P$, $k = R^3 f_P{}^2$

The period T(s) for an elliptical orbit is $T = 2\pi \sqrt[3]{\frac{a^3}{G[M1+M2]}}$ (1), which is the same for all ellipse with the same semi-major-axis a. Inversely for calculating the distance in meters, where a body has to orbit in order to have a given orbital period, *in second*, $a = \sqrt[3]{\frac{G[M_1 + M_2]T^2}{4\pi^2}}$ (2) where, G = The gravitational constant $= 6{,}67.10^{-11}\ Nm^2/Kg^2$; M_1, M_2 the masses of any two material-points.

From above relation is seen that Energy-Rim-Shapes C, are Discrete-Packets of Energy-levels, i.e.,

1.. Attraction of opposite forces $F_o \leftrightarrow F_P$ at points O, P creates the Central motion and Kepler's laws where Orbits are Plane-curves representing a Constant-Energy becoming from the squared Periods T^2, or Frequency $f_p{}^2$ representing the Imaginary-Energy-Part of monad and $\mathbf{r_n}^3$ representing the Real-Space-Part of monad $1 = C.f_n{}^2 r^3$. These constants are the Quantized-Curve-Rims.

2.. Since both semi-major axis $\bar{a}$, *the Position-vector*, and velocity $\bar{v}$, *the Velocity-vector*, define the Orbital-Plane, then Angular-momentum-vector $\bar{L}$, is perpendicular to vectors $\bar{a}$, $\bar{v}$, and is $\bar{L} \perp \bar{a}.\ \bar{v}$, or The magnitude $\bar{\mathbf{L}} = \bar{\mathbf{a}}\ x\ \bar{\mathbf{v}}$ = constant for all central motions.

For circular orbits gravitational force G_F equals the centripetal force C_F, so $C_F = G_F$ and $m_P v^2 / R = [G.m_P m_S] / R^2$ and velocity $v^2 = GM/R$ ………. (1)

Substituting the expression into the formula for Kinetic energy then,

$K_E = \frac{mv^2}{2} = \frac{m.GM}{2.R} = \frac{GMm}{2.R}$ ……… (2) or $K_E = (1/2)\ (-P_E) = -\frac{P_E}{2}$ and $-\ P_E = 2.K_E$ ………. (3)

The Total-energy $E = K_E + P_E = K_E - 2.K_E = -\ K_E$ ………. (4), i.e.,

The Potential-Energy is Always-Negative and Twice the Kinetic-energy While The Total-Energy of an Central-Orbiting-System is Negative.

5.. Conservation laws in Astronomy:

1.. Newton's second law tell us that acceleration on an object is proportional to the net force acting on it so objects move at constant velocity if no force acts on them.

Because of conservation of Momentum the Interacting objects exchange momentum

through equal and opposite forces [⊕ ↔⊖] ≡ [$\bar{v}.\nabla i$], therefore ***constant*** C = $r^3 . f_e^2$ is a ***Quantized-Energy-Storage***, a Constant Energy-Plane-Rim, in where Planets move at constant velocities without any force acting on them.

2.. In [70], the Work produced In Material-Point $\overleftrightarrow{AB}$ is equal to → $W = 2L = \bar{B}.\bar{w} = J.w^2$← consisting the First-Energy-Store which is a Stationary Wave with, n, lobes as, $W_{n(n+1)} = [\frac{4\pi r^2 f1}{3}].n.(n+1)$ and

wavelength $\lambda_N = \frac{\sigma.(1+\sqrt{5})}{4\pi r} = \frac{n.\bar{B}}{4\pi r^2}$, i.e.,

that which ***Happens in Material point***, Momentum as Work is $W_{n(n+1)}$ = constant in n-lobe, ***Happens to Planets orbiting the Sun***, so Because of conservation of angular momentum in the Constant Energy-Plane-Rim-Orbits, Planets with no twisting forces are continually rotating and orbiting the sun. Energy is concentrated at the Trajectories ≡ Rims ≡ Orbits because there exists the pressure of centripetal force as in Figure 6.

3.. Energy = motion = Work, and makes the matter move. In [70] the Work produced In Material-Point is conserved but can travel from one object to another, or change in form. From figure -1 Energy ≡ motion is kept in the Storages r = n (λ/2), and is so conserved and transferred from one object to another, or change in form. The types of energy-forms are, The Rotational, the eternal rotation of positive ⊕ around the negative ⊖, The Kinetic, motion, The Potential, stored motion, The Radioactive, wave motion, so, objects get their energy = motion from the Primary M-Points in-which motion exists Apriori, and transformed from one type to another.

4.. Angular momentum is the Constant Energy-Plane-Rim-Orbits of the System Sun-Planet. Only friction or atmospheric drag can change the orbit, and if an object gains orbital energy it moves to a more distant orbit with more energy. This is obvious from Planets constant C = $r^3 . f_e^2$ since frequency is increased.

The Kepler's Planar constant Principle:

Planet:	Period of Rotation (y) :	Frequency (n) :	Semi-major axis (m) :	$T^2/R^3 (s^2/m^3)$:	$k.f_n^2.r^3 = 1$
Mercury	→ 0,2410	4,1494	$5,79. 10^{10}$	2, 993	1
Earth	→ 1,0000	1,0000	$15,00. 10^{10}$	2, 974	1
Pluto	→ 248,3000	0,0040	$590,00. 10^{10}$	2, 993 10^{-42}	≡ 1

Each of the above Orbits consist an Energy-Plane-monad with a Constant-Quantized energy. We will show that above issues for Atom's structure, where Nucleus at focus is consisted of 1, 2, 3,4, n,,, [⊕] Protons which define the figure of (1) focus to be Circular-Rim and for (2) and more focus to be Ellipse-Rim. Each Proton in Atom creates only one Energy-Rim.

Since Medium-Field Material-Fragment → [± s²] = [MFMF] ≡ The Chaos, is the base for all motions, the Scales of The Universe occupy the same Work.

All motions create Work which is conserved. Motion presupposes velocity vector $\bar{\mathbf{v}}$

which, when it is in motion collides with other velocity vectors and creates Constant work, k. Motion may be Linear, or Rotational for any displacement, r, so exists The-Constant-Work → $k = \bar{\mathbf{v}} x \bar{\mathbf{v}}.\ \bar{\mathbf{r}} = v^2 r$

This Constant-Work is → $k = v^2 r = (w\ r)^2 r = [\frac{2\pi}{T}\mathbf{r}]^2 r = \frac{4\pi^2 r^2}{T^2}.\ r = \frac{4\pi^2 r^3}{T^2} = 4\pi^2.\ \frac{r^3}{T^2} = 4\pi^2.r^3.\mathbf{f}^2_{\mathbf{p}}$ …(k)

Equation (k) is Kepler-third-law, denoting that ***Macrocosm and Microcosm Obey Newton's Laws of motion in all Scales***. Photon during Motion in [MFMF] Chaos, collides with other Photons, by means of Vectors-Cross-Product, and produces a constant Work which is stored into the Only-Four Energy-Geometrical- Shapes, of the motion. The Interior motion is kept in its Wavelength-Tank

$2r = n\ \lambda$, and the Linear motion is continued by the Propagating Electromagnetic-Wave-conveyer.

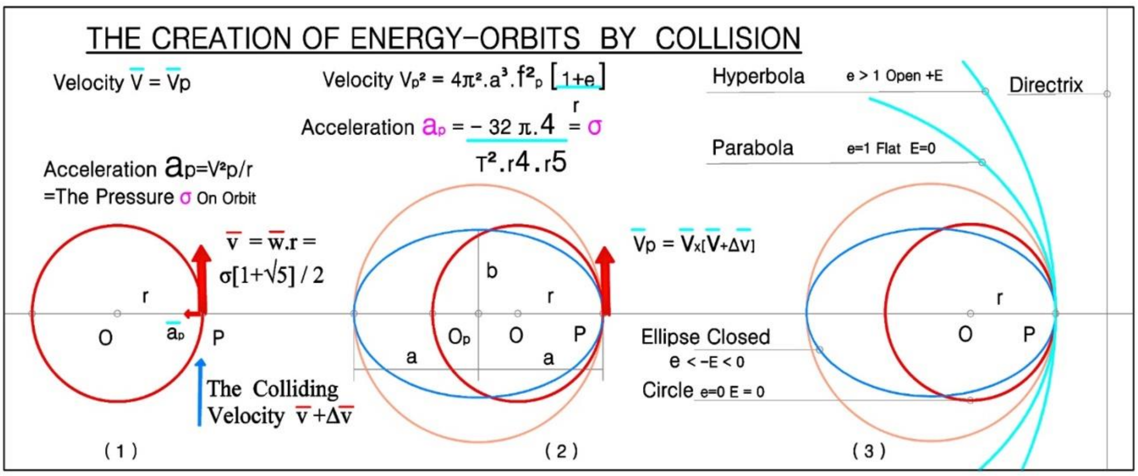

Figure 6. Velocities and Accelerations on, Planar and Atom, Orbits after Collision

In (1) is presented the Circular motion where the constant velocity is equal to $v = \mathbf{v}_{\mathbf{p}} = wr$ and the Centripetal-acceleration $\mathbf{a}_{\mathbf{p}} = \frac{v^2}{r}$

In (2) is presented the Elliptical motion after collision, where the acceleration is increased, the velocity is equal to $\mathbf{v}^2_{\mathbf{p}} = 4\ \pi^2 a^3.\ f_p^{\ 2}\ [\frac{1+e}{r}]$ and the Centripetal-acceleration $\mathbf{a}_{\mathbf{p}} = -\ \frac{32C^2a^2}{r^5} = -\ \frac{32\pi a^4[1]}{T^2 r^4\ [r^5]}$, and for $r = a \rightarrow\ a_p = -\ \frac{32\pi}{T^2 r^5}$, where $C = \frac{dS}{dt} = r^2 d\varphi/2$ = constant = Area covered in equal times.

In (3) are presented the Circular, Elliptical, Parabola, Hyperbola motion after collision, where acceleration is increased. The velocity is equal to

$\mathbf{v}^2_{\mathbf{p}} = 4\pi^2\ \frac{a^3}{T^2}\ [\frac{1+e}{r}] = 4\pi^2 a^3 f_p^{\ 2}[\frac{1+e}{r}] = k\ [\frac{2}{r} - \frac{1-e^2}{p}]$ and the Centripetal-acceleration

$\mathbf{a_p} = \frac{d^2r}{dt^2} - \frac{4c^2}{z^3}$, where k = $\frac{4C^2}{p}$ = constant, $\frac{d^2r}{dt^2}$ = Natural acceleration

5.. The Conservative System, Mechanical-energy and Shapes:

Conservative System is that, when the Total energy E = $K_E + P_E$, is constant where

K_E = the Kinetic energy and P_E = the Potential energy and $K_E + P_E$ = constant or $\frac{d}{dt}[K_E + P_E] = 0$, from the conservation of energy can be written E = $K_1 + P_1 = K_2 + P_2$, where, 1, 2, represent two instances of time.

If at time, 2, is the time corresponding to the maximum displacement of the mass then velocity of the mass is zero and $K_2 = 0$, where $K_1 + 0 = 0 + P_2$.

If the System is undergoing harmonic motion, the motion is repeated in equal intervals of time t, and x(t) = x(t + w), then K_1 and P_2 are maximum values and issues $K_{max} = P_{max}$. Summing the Kinetic and Potential energy we have $\dot{x}^2/2 + P(x) = E$ = constant (1) and solving for $\dot{x} = y$ then $y = \dot{x} = \pm\sqrt{2[E - P(x)}$ …(2) where trajectories must be symmetric about the x-axis, $\ddot{x} = f(x)$ (3) or $\ddot{x} = \dot{x}(d\dot{x}/dt) = f(x)$ and (3) is written $\dot{x}.d\dot{x} - f(x).dx = 0$ …… (4)

Integrating $\frac{\dot{x}^2}{2} - \int_0^x f(x)dx = E$ and by comparison with (1) then $P(x) = -\int_0^x f(x)dx$ and f(x) = - dP/dx,

i.e., for a conservative System the Force is equal to the negative gradient of the Potential-energy, and is

$\frac{dy}{dx} = \frac{f(x)}{y}$ …. (5) Equations note that, at the equilibrium points the slope of the potential energy curve

P(x) = 0. It can be shown that the minima of P(x) are stable equilibrium while, positions corresponding to the maxima of P(x) and are positions of unstable equilibrium. Since the trajectories maybe closed curves as this happens in orbitals, the period associated with them is $T = 2\int_{x1}^{x2} dx/\sqrt{2[E - P(x)}$ where x_1,x_2, are extreme points of the trajectory on x-axis.

In Figure 6, mass m, at point P, is orbiting with velocity vector $\bar{\mathbf{v}}$, analyzed into the radial $\overline{v_1}$, and the tangential $\overline{v_2}$, both perpendicular to PF_1, PF_2. Since sum $PF_1 + PF_2 = 2a$ = constant, therefore $v_1 + v_2 = 0$, and $v_1 = - v_2$, i.e., the two velocities are of equal magnitude and opposite sign and, velocity on tangent at P, is the external bisector of PF_1, PF_2 vectors.

The Kinetic energy breaks into two parts as $K_E = mv_1{}^2/2 + mv_2{}^2/2$ (a), and the magnitude of the Angular-momentum L = r m v_2, and in terms of L, then $K_E = \frac{1}{2} mv_1{}^2 + \frac{L^2}{2mr^2}$ and adding the

Negative Potential energy $P_E = G\frac{Mm}{r}$ then Total energy E = $K_E + P_E = \frac{1}{2} m\mathbf{v_1}{}^2 + \frac{\mathbf{L^2}}{\mathbf{2mr^2}} - G\frac{\mathbf{Mm}}{\mathbf{r}}$ (b)

Turning points, r_p perihelion, r_a aphelion, are the distances of closest approach and further recession, where $v_1 = 0$, $v_2 = 0$, and (b) becomes $\frac{L^2}{2mr^2} - G\frac{Mm}{r} = E$ or → $E = r^2 + G\frac{Mm}{E} r - \frac{L^2}{2mE} = 0$, an equation with the two roots r_p and r_a, as $(r - r_p).(r - r_a) = 0$, or $r^2 - (r_p + r_a).r + (r_p\ r_a) = 0$ where is the Sum of roots $[r_p + r_a]$ = - G $\frac{Mm}{E}$ = 2a from where $\frac{2E}{m} = \frac{GM}{a}$, and Product of roots $[r_p.r_a]$ = - $\frac{L^2}{2mE}$ from where L = r.mv, v = L/r.m, and the Total-Energy is E = $\frac{1}{2}m[\frac{L}{rm}]^2 = \frac{L^2}{2mr^2}$

The turning points are related to the axes of the ellipse by $r_p + r_a$ = 2a, and $r_p.r_a = b^2 = -\frac{L^2}{2mE}$ so,

Energy on Orbit E = $\frac{\mathbf{GMm}}{\mathbf{2a}}$, Angular-momentum $L^2 = -2m.E.b^2$(c)

From Kepler laws, the area, S, swept out by the line $PF_1 = r$ is $dS = r^2.d\theta/2$ and the rate of swept is $\frac{dS}{dt}$ = $(r^2/2).(d\theta/dt) = \frac{1}{2}r^2w = \frac{1}{2}r(r\,w) = \frac{L}{2m}$, since r w = v and, m $r^2w = L.f^2{}_n$. Since also L is a constant, according to Kepler second law radius r, sweeps out equal areas during equal intervals of time and for the total area → π ab = S = $\int \frac{L}{2m}dt = \frac{LT}{2m}$, and T is the period of rotation.

From above $S^2 = \frac{L^2T^2}{4m^2} = \pi^2a^2$ [b = π a$(\frac{L^2}{2mE})$], or $\frac{T^2}{a^2} = \frac{4\pi^2 m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2 a}{GM}$ and → $\frac{\mathbf{T^2}}{\mathbf{a^3}} = \frac{\mathbf{4\pi^2}}{\mathbf{GM}}$ = constant. From relation $\frac{T^2}{a^3} = \frac{4\pi^2}{GM} = k = \frac{1}{f^2{}_n.a^3}$ becomes → $1 = k.\mathbf{f}^2{}_{\mathbf{n}}.\mathbf{a^3} = \frac{\mathbf{4\pi^2}}{\mathbf{GM}}.\mathbf{f}^2{}_{\mathbf{n}}.\mathbf{a^3}$ …… (d)

From Web $r^2(\theta) = [\frac{L^2/m}{E \pm \sqrt{E^2 - kL^2/m})\sin 2(\theta-\theta_0)}]$ ……. (e) which is an ellipse.

Equation (e) denotes Ellipses and circle, having a constant Energy-Shape when are given the Geometrical parameters related to the Physical parameters, Angular momentum (L), Total energy (E). For a central gravitational force, the Potential-energy P_E = - GMm/r and,

$\theta(r) = \int d\theta = \pm \frac{l}{\sqrt{2m}} \int_0^r \frac{dr/r^2}{\sqrt{E\,r^2 + GMmr - L^2/2m}}$ ……… (f) Placing,

a = - L ²/2m, b = GMm, c = E, then, $\int_0^r \frac{dr/r}{\sqrt{a + br + c\,r^2}} = \frac{1}{\sqrt{-a}}.\sin^{-1}(\frac{br+2a}{r\sqrt{b^2 - 4ac}})$ …… (f1)

and $\theta - \theta_0 = \pm \sin^{-1}(\frac{GMm^2 - L^2}{GMm^2 r})$ and eccentricity e = $\sqrt{1 + 2EL^2/G^2M^2m^3}$ …… (f2)

where θ_0 is a constant of integration. Solving for r then r = $\frac{L^2/GMm^2}{1 \pm e\sin(\theta-\theta_0)} = \frac{L^2/GMm^2}{1 + e.\cos\theta}$ at periapsis…(f3) creates only one Energy-Rim. Velocity Related to the distance [r] of the Planet [the Orbiter], to the Sun [the Focus], is from Figure 6, the velocity equation in a Central motion is $v^2 = 4C^2[\frac{e^2\sin^2\varphi}{p} + \frac{1}{r^2}]$…(f4) where constant C = $\frac{\pi ab}{T}$ = π ab, $f_p = \frac{dS}{dt} = r^2d\varphi/2$ = The covered orbiting area per time second, and $\frac{d(1/r)}{d\varphi} = -\frac{e\sin\varphi}{p}$. From a(1) r = $\frac{p}{1+e\cos\varphi}$ and velocity is,

$v^2 = 4C^2[\frac{e^2\sin^2\varphi}{p^2} + \frac{1+e^2\cos^2\varphi+2e\cos\varphi}{p^2}] = \frac{4C^2}{p^2}[e^2+1+2e\cos\varphi] = \frac{4C^2}{p}[\frac{e^2+1}{p} + \frac{2}{r} - \frac{2}{p}] = \frac{4C^2}{p}[\frac{2}{r} - \frac{1-e^2}{p}]$…(f5)

and for ellipse issuing $2a = r_{\varphi=0} + r_{\varphi=a} = \frac{p}{1+e} + \frac{p}{1-e} = \frac{2p}{1-e^2}$ therefore,

$v^2 = \frac{4C^2}{p}[\frac{2}{r} - \frac{1-e^2}{p}] = \frac{\mathbf{4C^2}}{\mathbf{p}}[\frac{\mathbf{2}}{\mathbf{r}} - \frac{\mathbf{1}}{\mathbf{a}}]$ …….(f6)

From (f6), when Planet is at Perihelion near the Sun $\frac{1}{r} = \frac{1+e}{p}$, then velocity is

$v^2 = \frac{4C^2}{p}[\frac{2}{r} - \frac{1-e^2}{p}] = \frac{4C^2}{p}[\frac{2}{r} - \frac{1-e}{r}] = \frac{\mathbf{4C^2}}{\mathbf{p}}[\frac{\mathbf{1+e}}{\mathbf{r}}]$, where $\frac{4C^2}{p} = \frac{4(\pi ab/T)^2}{b^2/a} = 4\pi^2 \frac{a^3}{T^2}$, which is the Kepler constant, and

$v^2 = 4\pi^2 \frac{a^3}{T^2} [\frac{1+e}{r}] = [4\pi^2 a^3.\ f_p{}^2].[\frac{1+e}{r}] = K[\frac{1+e}{r}]$ …….(f6a),

The velocity at Perihelion for eccentricity e < 1 → $v^2 = K[\frac{1+e}{r}] < K\frac{2}{r}$ and Planet follows Elliptic Orbit.

For eccentricity e = 1 → $v^2 = K[\frac{1+e}{r}] = K\frac{2}{r}$ and Planet follows Parabolic-Orbit

For eccentricity e > 1 → $v^2 = K[\frac{1+e}{r}] > K\frac{2}{r}$ and Planet follows Hyperbolic-Orbit

In a circular motion is shown that, velocity is proportional to the inverse square of radius r, and Newton-force, acceleration, the fifth, where

$C = \frac{\pi ab}{T} = \frac{\pi a}{T}[\frac{1}{r^2}] = \frac{\pi a}{T r^2}$, From relation r = 2a.cos φ is, $\cos\varphi = \frac{r}{2a}$ and

$\frac{1}{r} = \frac{1}{2a\cos\varphi}$ also $\frac{d1/r}{d\varphi} = \frac{1}{r}\tan\varphi$, and (f4) is $v^2 = 4C^2[\tan^2\varphi + 1] = \frac{4C^2}{r^2}\frac{1}{\cos^2\varphi} = \frac{16C^2a^2}{r^4}$ and velocity becomes $v = \frac{\mathbf{4Ca}}{\mathbf{r^2}}$ ………… (f7)

Centripetal-acceleration $a_p = \frac{v^2}{r} = -\frac{16C^2a^2}{r^4}\frac{1}{a} = -\frac{16C^2a}{r^4}$ and equal to $\frac{a_p}{\cos\varphi}$, so Centripetal

acceleration $\mathbf{a_p} = -\frac{\mathbf{32C^2a^2}}{\mathbf{r^5}} = -\frac{\mathbf{32\pi a^4[1]}}{\mathbf{T^2 r^4[r^5]}}$, for r = a then $\mathbf{a_p} = -\frac{\mathbf{32\pi}}{\mathbf{T^2r^5}}$ ……… (f8)

2. Conclusion

1.. Orbits**:** In Orbits issues the **Piezoelectric-effect**, as this is used in a, ***Lattice-Disk*** (*Orbits, Caves, Material-Points, Particles, Atoms, Molecule, Crystals, Microchips, etc.*) ***where is Converted the Mechanical Energy which is Work***, ***into Electricity*** (*Electrical Potential as a Voltage*), ***across the sides of the Disk*** or vice versa, i.e., ***When on a Lattice-Disk, is Put a Voltage across the Disk***, *so thus its* **Inside-content** *is subjecting* ***to an*** *electrical-Pressure,* **Inside-content** ***has to move to rebalance***, and thus deformed***. Gravity is Potential-energy with binder Energy-Field*** {[∇i] = [± s ?] a constituent in MFMF Field, *the called Gravity force without Vibration but only local rotation*}, ***from Energy-Vectors occurring in any Material-Point*** [⊕↻↺⊖] ***in Gravity-field***, *and this because are axially on their Spin-Vector* $\overline{B}$ ≡ *Spin* ≡ *Rotational-Energy,* ***and which*** **Energy-Vectors** ≡ *Spin,* ***is the*** **Inside-content** of the Gravity-field.

The ***Dot-product*** happens for interactions between *Similar dimensions*, while the ***Cross-product*** between *Different-dimensions.* Cross-product of two vectors $\bar{a}$, $\bar{b}$ is $\bar{a} \times \bar{b} = |\bar{a}|.|\bar{b}| \sin\theta.\bar{n}$ and for

$\bar{a} = \bar{b}$ and θ = 90° then $\bar{a}$ x $\bar{a}$ = $\bar{a}^2$ and for Quaternion, **s,** which performs the Work of rotating the one vector around the other is → Work = $\bar{a}$ x $\bar{a}$ = $\bar{a}^2 \bar{r}$, and for $\bar{a} = \bar{v}$ then → Work = $\bar{v}^2 \bar{r}$ $= |\bar{v}|.|\bar{v}|.\bar{r} = v^2 r. \bar{n} = (wr)^2. \bar{n}$, **or** Work = $(wr)^2.\bar{n} = (2\pi r/T)^2 r \bar{n} = (4\pi^2 r^2/T^2). r.\bar{n} = \frac{4\pi^2 r^3}{T^2}. \bar{n}$ ←

$\mathbf{W = 4\pi^2. \frac{r^3}{T^2}. \bar{n} = 4\pi^2.r^3. f^2_p. \bar{n}}$ i.e., ***Kepler constant celestial law for microcosm.***

Kinetic Energy*, motion,* in Orbits becomes from the, ***Piezoelectric-effect***, where Orbit is subject to a Mechanical-stress, $\boldsymbol{\sigma = \pm \frac{4\pi r}{(1+\sqrt{5})}. f_p}$, *becoming from the Centripetal-acceleration* $\mathbf{\bar{a}_P}$ *of the* ***Planet*** and thus is appeared a Positive charge at the ***Nucleus*** and a Negative-charge at the ***Planet***, so is created an electric-signal with a given frequency $\mathbf{f_p}$. The two faces at **N** and **P** are connected by the in-between ***Energy-Vectors*** $\bar{B}$ ≡ *Spin*, of the oriented Gravity-field [∇i] = [⊕↻↺⊖].

In Orbits which are Negative-Energy-Rims, with binder Energy the atraction between the two opposite forces $P_N \leftrightarrow P_P$ at points Focus **N** and Planet **P**, is created the Central motion where, ***Orbital-Resonance*** is the Plane Surfaces, representing a Constant-Energy-Rim following the Celestial Kepler Laws ***and say this as an Plane Energy-Resonance***, because happens in-Plane and on Energy-Field-vectors of Spins $\bar{B}$

In Figures 3, 6 are shown the Ellipse-Orbits, $1 = c. f_n^2 r^3$ with their content which is The Spin-Field-vectors $\bar{B}$ in all area **πab** of MFMF field. During orbiting centripetal acceleration $\mathbf{\bar{a}_P = \sigma = \pm \frac{4\pi r}{(1+\sqrt{5})}. f}$ is directed to Focus N, i.e., ***Orbit is subject to a Mechanical-stress σ, becoming from a Centripetal-acceleration*** $\mathbf{\bar{a}_P}$ ***,*** *and so* ***is appeared the*** **Piezoelectric-effect** with Positive-charge ***at the Nucleus*** and Negative-charge ***at the Planet*** ≡ Material-point.

The two faces at **N, P** ***are connected by the in-between Gravity-field*** [∇i] = [± s] in [MFMF] Field ***and flows Current,*** motion is realized by the orientation of the infinite Spin-Energy-vectors, ***which is the Resonance on Orbit,*** the Gravity Force, **g**.

In the ***Inverse*** Piezoelectric-effect on Orbit, ***when a voltage is applied across its opposite*** faces at N, P, becoming from the [⊕↔⊖] stretching, then Orbit becomes mechanically stressed, ***Deformed in Shape by the Resonance at*** **N** and **P.**

Further is seen, ***Orbit*** or, a ***Negative-Energy-Rim***, is the Stable and Stationary Granular-lattice Energy-Disk, ***which is kept in the Plane-Orbit of motion***, *Ellipse area* πab, ***in Gravity - field***, and in a way it is ***Opposite*** to that which ***follows the Central motion***, i.e., either for macrocosm or microcosm, ***Gravity-Force-Vectors*** $\bar{B}$ ≡ *Spin*, ***of Material-points as Spin*** [⊕↻↺⊖] ***is packet into the Orbit-Rim as Energy-conveyer for the interactions between, the*** **Nucleus N**, ***and the orbiting object***, the **Planet P,** and consists the energy-quanta, ***the minimum constant energy***, for motion → [⊕↻↺⊖] ← ***in the monad*** **Atom-Rim**.

2.. The minimum Energy RIM**:**

a.. From orbiting equation $\frac{T^2}{a^2} = \frac{4\pi^2 m}{2E} = \frac{4\pi^2}{2E/m} = \frac{4\pi^2 a}{GM}$ then $\frac{\mathbf{T}^2}{\mathbf{a}^3} = \frac{\mathbf{4\pi^2}}{\mathbf{GM}}$ = constant k = $\frac{1}{f^2_n . a^3}$ or 1 = k.

$\mathbf{f^2_n . a^3}$

= $\frac{\mathbf{4\pi^2}}{\mathbf{GM}}. \mathbf{f^2_n . a^3}$, the constant Work 1 / k = $f_n{}^2 a^3$ and the constant Energy E, *in Orbit*, is k = E = $\frac{T^2}{a^3}$

From equation 1 = $c.f_n{}^2 a^3$ and constant work 1/k = $f_n{}^2 a^3$ the constant energy in Orbit is k = $\frac{T^2}{a^3}$ ….. (e)

It was shown that the maximum Energy in Hydrogen atom is E = h f = -13,6 eV = - 13,6 x $1{,}6.10^{-19}$ = $2{,}176.10^{-18}$ Joule, the frequency is f = E / h or, f = $2{,}176.10^{-18}$ J / $6{,}6262.10^{-34}$ J.s = 3, 28393.10^{15} /s, and the Period in Orbit, T = f^{-1} = $3{,}04513.10^{-16}$ s.

The motion of all moving Energy-tanks is Sinusoidal as equation → {[εE² + μB²] = 2.λc.sin.2φ} ← (e1) and the work produced is stored in their Sine-curve-area of x, y, coordinate axis as $\int_0^\pi \sin x \, dx = 2$ as equation (e1). Simultaneously Work = sine Integral $= \int_0^t \frac{\sin t}{t} dt = 1$, at Critical-Energy-point where point is such that Si(x = 1) becomes equal to monad 1, and this critical-energy-unit happens at the point x = 1, 0572508754, or at axis → a = 2x = 2,1145016 m.

From relation $(4\pi a^3/3)^3 = 1{,}616229.10^{-35}$, a = $5{,}447.10^{-11}$, or semi-major axis in Hydrogen cave is a = 10^{-11} m, and the Basic-coefficient [2Si(1)], is the constant a = 2x = $2{,}1145016.10^{-11}$ m. Placing in Hydrogen-Rim the Period **T**, and the prior Semi-major axis **a**, then $\mathbf{k} = \frac{\mathbf{T}^2}{\mathbf{a}^3} = \frac{[3{,}04513.10^{-16}]^2}{[2{,}1145016.10^{-11}]^3} =$

$\frac{9{,}272817.10^{-32}}{9{,}4541768.10^{-33}} = \mathbf{9{,}\ 808238}\ \frac{s^2}{m^3} = \frac{N}{Kg}$, ***agreeing with Gravity* g,** *as is measured*.

i.e., **The Minimum-Work → $\mathbf{W = 4\pi^2 \frac{r^3}{T^2}. \bar{n} = 4\pi^2.r^3.f^2_p. \bar{n}}$ ←**

in an Negative-Elliptic-energy-field-Disk *as this is* PNS, **is stored as a Voltage** [N≡⊕↔⊖≡P] across the Disk between the rotating Planet P and Nucleus N, **Produced from** *the pressure*, **σ**, *of the frequency* $\mathbf{f_p}$ *and of the semi-major axis* $\mathbf{a_p}$ of the Planet.

Motion is Kept, *is quantized*, as work → **W =1= k ≡ [∇i].**[±s ⃗] ≡ MFMF Field ← ***in the Orbit-area***, πab, upon the Spin $\bar{\mathbf{B}}$ ***Orientation of the Pointy-Material-points*** [±s ⃗].Orientation of Spin becomes from the Energy in the sinusoidal gravity-fields in orbit, created by the motion of oscillation of the material points [⊕↻↺⊖].

Any ***Interaction*** between this ***Oriented-Energy Disk-Rim*** and a ***Body-Planet*** creates disturbances in Disk and ***Reorientation of Spin*** $\bar{\mathbf{B}}$ ≡ motion ≡ work ≡ k = constant = quanta and transformed as, ***The Gravity-Force in Disk***, and which Energy is equal to the Gravity acceleration **g,** and this because *g = force,* as equation g = F/m.

Bodies produce Gravity {*the change of Spin-direction of* M-P-Dipole [⊕s ↻↺⊖s ⃗] *in* MFMF *field*} ***from stationary force*** [∇i] = ± s ⃗ *and because Gravity* ≡ *acceleration and not change of velocity vector,* ***it is by changing the direction*** of the above dipole.

b.. Motion with velocity vector v, may be ***Linear or Rotational*** for all displacements **r**, and thus exists a constant - work W = **k** = $\bar{\mathbf{v}}\mathbf{x}\bar{\mathbf{v}}.\ \bar{\mathbf{r}}$ = v ²r. $\bar{\mathbf{n}}$. i.e.,

Constant-Work = k = v ² r = (wr) ²r = $[\frac{2\pi}{T}r]$ ²r = $\frac{4\pi^2 r^2}{T^2}$. r = $\frac{4\pi^2 r^3}{T^2}$ = 4π². $\frac{r^3}{T^2}$ = 4π².r³.$\mathbf{f}^2_{\mathbf{p}}$

Because Gravity-Force F_G becomes from the in-storages acceleration a = v ²/r of the MFMF material points and force [∇i] is stationary, and this because from the pointy-rotated-dipole [-s ↻↺+s], then for Planck length is,

Gravity force [∇i] ≡ F_G ≡ $m_G g$ = g.∇[$\frac{\sigma}{c^2}$] ²r = $m_G \frac{v^2}{r}$ = Jw ²g_G = $[\frac{\pi r^4}{2}]$ w ² $\frac{v^2}{r}$ = $\frac{v^2}{r}$ $[\frac{\pi r^4}{2}]$ $\frac{v^2}{r^2}$ =

$[\frac{\pi r v^4}{2}]$ ……..(b) and from relation, Spin S = $\bar{\mathbf{B}}$ = $\frac{h\sqrt{3}}{4\pi}$ then,

Gravity-force → $F_G \equiv [\frac{\pi v^4}{2}] \frac{n\pi}{2h(1+\sqrt{5})}\bar{\mathbf{B}} = [\frac{\mathbf{n}\pi^2}{\mathbf{4h(1+\sqrt{5})}}]\ \bar{\mathbf{B}}v^4$ and so $F_G \equiv \frac{n\pi\sqrt{3}}{16(1+\sqrt{5})}v^4 = \frac{n\sqrt{3}\pi}{(1+\sqrt{5})}(\frac{v}{2})^4$

***and it is the Black-hole-gravity-equation which is related to the Inner velocity* v*, and to its* n *lobes*.**

Gravity-Acceleration in Black-holes is g_G= s$[\frac{\pi r v^4}{2}]$ =$[\frac{3{,}1415926\left([\sqrt{5}+1].\sqrt[4]{2}.10^{-35}\right).(299793458)^4}{2}]$.$e^3$ =

$6{,}044981.10^{-35}.80{,}776078.10^{32}.20{,}085536$ = g_G **= 9,8075633**, near all the prio, *where*
$1/m_G$ = s = mass-coefficient [√5+1]. $\sqrt[4]{2}$. e^3, because the constant tensor T_z is the length of vector, **z ≡ m**, in Euclidean coordinates and which magnitude is k = $T_z = \sqrt{{y_1}^2 + {y_2}^2 + {y_3}^2 + {y_n}^2}$, denoting the Energy-Space relation.
From above the dimensionless coefficient of work W is [√5+1] for any Material cave, r, coefficient for the Unity-Plane - Quaternion is $\sqrt[2]{\sqrt[2]{2}} = \sqrt[4]{2}$, or the same $\overleftrightarrow{\imath \perp \jmath \equiv \sqrt{2}} + \overleftrightarrow{k \perp \sqrt{2} \equiv \sqrt[2]{\sqrt[2]{2}}} = \sqrt[4]{2}$

and for the Three dimensions Euler Rotation number-System as e. e. e = e^3.
Bodies produce Gravity { *the change of Spin-direction of* M-P-Dipole [⊕s ↻↺⊖s] *in* MFMF *field* } ***from stationary forces*** [∇i] **= ± s ²** ***as dipole***, *and this because Gravity ≡ acceleration and Not by the change of velocity vector,* But, ***by the changing of Direction*** of the above dipole [⊕s ↻↺⊖s].
The produced Work ≡ Gravity ≡ Energy ≡ Constant becomes from the eternal-motion on Orbits for any Planet, *and is stored or taken from the Pointy-Dipole in Orbits*, either in microcosm or macrocosm.

3. Discussion

The way that Potential-Energy is stored, *is that of Material-LRC-circuit*, which is for the Gravitational Potential-Energy the Material-Capacitor or the → Focus-Planet-Sector-Stores-charge ← which develop a voltage in response to that charge. The coil of wire is the infinite Stationary-Dipole-Spinning Material Points of this → Focus-Planet-Sector ← which develops the back-emf, when the current through them changes. A wide analysis in [68].

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